Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1-18. (Canceled)

19. (New) In a system using multiple smart matter dynamic controllers, each controller comprising one or more actuator-sensor pairs, a method for dynamic control of the system, comprising:

representing each controller using one or more control system models;

executing each of control system models and predicting future performance of the system after one or more time intervals as a weighted sum of individual predictions of each model for each controller;

measuring actual performance of the system after said one or more time intervals;

for each controller, computing a prediction error as the difference between the predicted performance and the measured actual performance of the subsystem controlled by the controller;

adjusting the weights of at least two control system models based on their prediction errors relative to the prediction errors of other models wherein adjusting the weights of at least two control system models includes increasing a weight of at least one control system model in the plurality of control system models relative to a weight of at least one other model; and

using the control system models and the adjusted weights in the dynamic controllers for dynamic control of the system during next time interval.

20. (New) The method of claim 19, wherein the plurality of control system models comprises N control system models and each of the N control system models is initially assigned a weight w_i such that

$$\Sigma_{i=1}^{N} w_i = 1$$

21. (New) The method of claim 19, wherein adjusting the weights of at least two control system models includes defining a fraction a_i of a weight w_i, of an i^{th} model, where $0 < a_i < 1$, which will be adjusted for the next time interval.

22. (New) The method of claim 21, wherein each model is used to predict, at a current time t, a future state of the multiple actuator-sensor smart matter dynamic control system at a later time $(t+\Delta t)$:

$$x_i\,(t + \Delta t;\, x(t),\, u(t)),$$

where x(t) is a state of a multiple actuator-sensor smart matter dynamic control system at time t, $x_i\,(t + \Delta t)$ is a state of a multiple actuator-sensor smart matter dynamic control system at time $t + \Delta t$ estimated by the i^{th} model, and u(t) is a control input at time t.

23. (New) The method of claim 22, further comprising assigning a new weight w_i^{new} for the i^{th} model according to the formula

$$w_i^{new} = (1- a_i)\ w_i^{old} + a_i\ [(\ 1/\ (e_i^2 + \sigma^2))\ /\ (\Sigma_{j=1}^{N}(\ 1/\ (e_j^2 + \sigma^2)))],$$

where w_i^{old} is a previous weight for the i^{th} model, e_j is a prediction error of the i^{th} model, and σ^2 is a noise variance of the multiple actuator-sensor smart matter dynamic control system.

24. (New) The method of claim 19, further including repeating the predicting, determining and adjusting steps for successive time intervals.

25. (New) The method of claim 19, further including summing prediction error over a multiple intervals for each prediction model for use in adjusting the weights.

26. (New) The method of claim 19, further comprising adding new models.

27. (New) Smart matter dynamic controllers for a system, each controller comprising one or more actuator-sensor pairs, each dynamic controller further comprising:

means for representing the controller using one or more control system models;

means for executing each of control system models and predicting future performance of the system after one or more time intervals as a weighted sum of individual predictions of each model for each controller;

measuring actual performance of the system after said one or more time intervals;

means for computing a prediction error as the difference between the predicted performance and the measured actual performance of the subsystem controlled by the controller;

means for adjusting the weights of at least control system models based on their prediction errors relative to the prediction errors of other models wherein adjusting the weights of at least two control system models includes increasing a weight of at least one control system model in the plurality of control system models relative to a weight of at least one other model; and

means for using the control system models and the adjusted weights in the dynamic controllers for dynamic control of the system during next time interval.

28. (New) The controllers of claim 27, wherein the plurality of control system models comprises N control system models, and each of the N control system models is initially assigned a weight w_i such that

$$\Sigma_{i=1}^{N} w_i = 1.$$

29. (New) The controllers of claim 27, wherein means for adjusting the weights of at least two control system models includes means for defining a fraction a_i of a weight w_i, of an i^{th} model, where $0 < a_i < 1$, which will be adjusted for the next time interval.

30. (New) The controllers of claim 27, wherein each model is used to predict, at a current time t, a future state of the multiple actuator-sensor smart matter dynamic control system at a later time $(t+\Delta t)$:

$$x_i\,(t + \Delta t;\, x(t),\, u(t)),$$

where x(t) is a state of a multiple actuator-sensor smart matter dynamic control system at time t, $x_i\,(t + \Delta t)$ is a state of a multiple actuator-sensor smart matter dynamic control system at time $t + \Delta t$ estimated by the i^{th} model, and u(t) is a control input at time t.

31. (New) The controllers of claim 29, wherein the means for increasing a weight assigns a new weight w_i^{new} for the i^{th} model according to the formula

$$w_i^{new} = (1- a_i)\ w_i^{old} + a_i\,[(\ 1/\,(e_i^2 + \sigma^2))\,/\,(\Sigma_{j=1}{}^{N}(\ 1/\,(e_j^2 + \sigma^2)))],$$

where w_i^{old} is a previous weight for the i^{th} model, e_j is a prediction error of the i^{th} model, and σ^2 is a noise variance of the multiple actuator-sensor smart matter dynamic control system.

32. (New) Smart matter dynamic controllers for a system, each controller comprising one or more actuator-sensor pairs, each dynamic controller further comprising:

one or more control system models;

an execution circuit for executing each of control system models and predicting future performance of the system after one or more time intervals as a weighted sum of individual predictions of each model for each controller;

a measurement circuit for measuring actual performance of the system after said one or more time intervals;

a predicting circuit for computing a prediction error as the difference between the predicted performance and the measured actual performance of the subsystem controlled by the controller;

an adjustment circuit for adjusting the weights of at least two control system models based on their prediction error relative to the prediction errors of other models wherein adjusting the weights of at least two control system models includes increasing a weight of at least one control system model in the plurality of control system models relative to a weight of at least one other model; and

an implementation circuit that uses the control system models and the adjusted weights in the dynamic controllers for dynamic control of the system during next time interval.

33. (New) The controllers of claim 32, wherein the plurality of control system models comprises N control system models, and each of the N control system models is initially assigned a weight w_i such that

$$\Sigma_{i=1}^{N} w_i = 1.$$

34. (New) The controllers of claim 32, wherein adjusting the weights of at least two control system models includes defining a fraction a_i of a weight w_i, of an i^{th} model, where $0 < a_i < 1$, which will be adjusted for the next time interval.

35. (New) The controllers of claim 32, wherein each model is used to predict, at a current time t, a future state of the multiple actuator-sensor smart matter dynamic control system at a later time (t+Δt):

$$x_i\ (t + \Delta t;\ x(t),\ u(t)),$$

where x(t) is a state of a multiple actuator-sensor smart matter dynamic control system at time t, $x_i\ (t + \Delta t)$ is a state of a multiple actuator-sensor smart matter dynamic control system at time $t + \Delta t$ estimated by the i^{th} model, and u(t) is a control input at time t.

36. (New) The controllers of claim 34, wherein the weight increasing circuit assigns a new weight w_i^{new} for the i^{th} model according to the formula

$$w_i^{new} = (1 - a_i)\ w_i^{old} + a_i\ [(\ 1/\ (e_i^2 + \sigma^2))\ /\ (\Sigma_{j=1}^{N}(\ 1/\ (e_j^2 + \sigma^2)))],$$

where w_i^{old} is a previous weight for the i^{th} model, e_j is a prediction error of the i^{th} model, and σ^2 is a noise variance of the multiple actuator-sensor smart matter dynamic control system.